Welded static non-pressurised thermoplastic tanks - Part 2: Calculation of vertical cylindrical tanks

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EESTI STANDARDI EESSÕNA **NATIONAL FOREWORD**

Käesolev Eesti standard EVS-EN 12573-2:2000 sisaldab Euroopa standardi EN 12573-2:2000 ingliskeelset teksti. Käesolev dokument on jõustatud 12.09.2000 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 12573-2:2000 consists of the English text of the European standard EN 12573-2:2000. This document is endorsed on 12.09.2000 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.

Käsitlusala: This standard establishes ruels for the design and calculation of welded static, vertical, non-pressurised, cylindrical, flat-bottom thermoplastic tanks.	**Scope:** This standard establishes ruels for the design and calculation of welded static, vertical, non-pressurised, cylindrical, flat-bottom thermoplastic tanks.

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Võtmesõnad:

EUROPEAN STANDARD
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English version

Welded static non-pressurized thermoplastic tanks

Part 2: Calculation of vertical cylindrical tanks

Cuves statiques soudées en matières thermoplastiques sans pression – Partie 2: Calcul des cuves cylindriques verticales

Geschweißte ortsfeste drucklose Behälter (Tanks) aus Thermoplasten – Teil 2: Berechnung von runden stehenden Behältern (Tanks)

This European Standard was approved by CEN on 2000-02-14.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 266 "Thermoplastic static tanks", the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2000, and conflicting national standards shall be withdrawn at the latest by September 2000.

prEN 12573:1999 "Welded static non-pressurised thermoplastic tanks" consists of:

Part 1: General principles
Part 2: Calculation of vertical cylindrical tanks
Part 3: Design and calculation of single skin rectangular tanks
Part 4: Design and calculation of flanged joints

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This standard establishes rules for the design and calculation of welded static, vertical, non-pressurised, cylindrical, flat-bottom thermoplastic tanks. This standard applies to tanks fabricated in the following thermoplastics:

Polyethylene (PE)
Polypropylene (PP)
Poly (vinyl chloride) (PVC)
Poly (vinylidene fluoride) (PVDF)

This standard does not take into account wind and/or snow loading.If wind or/and snow loading has to be taken into account additional calculations are necessary.

This standard is applicable to tanks in which the cylindrical shell is made of welded plates or a wound cylinder or an extruded pipe.

The calculation takes into account short-term and long-term active pressures as well as the hydrostatic loading. The following values are long-term pressures and represent the limiting values:

Overpressure: 0,0005 N/mm^2 (0,005 bar)
Low pressure: 0,0003 N/mm^2 (0,003 bar)

This standard is only applicable to tanks which are not intended to withstand internal pressure or vacuum, other than that which may occur during the transfer of fluids (including gases) in their normal operation.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

prEN 12573-1:1999	Welded static non-pressurised thermoplastic tanks – Part 1: General principles
EN 1778	Characteristic values for welded thermoplastic constructions – Determination of allowable stresses and moduli for design of thermoplastic equipment

3 Symbols and abbreviations

For the purposes of this part of this Standard the following symbols and abbreviations apply:

a	is the depth of the weld seam, in millimetre
b	is the width of the nozzle compensation around the nozzle, in millimetre
C_1	is the load increase factor
C_2	is the material specific design factor
C_3	is the design factor for a two layered tank
C	is $C_1 \times C_2$
d	is the nominal inside diameter of the tank, in millimetre
d_A	is the nozzle outside diameter, in millimetre
d_L	is the diameter of hole in lifting lug, in millimetre
$E_{c(al.)St}$	is the allowable creep modulus at the design condition for stability (temperature, stress, time, medium, safety), in newton per square millimetre, see EN 1778
f_l	is the long-term welding factor
g	is the acceleration due to gravity, in metre per square second (9,81 m/s^2)
g_d	is the surface related weights, in newton per square millimetre
h_F	is the height at the maximum filling capacity, in millimetre
$h_{F(i)}$	is the height of the liquid above the lower edge of the band (i), in millimetre
h_Z	is the total cylindrical height, in millimetre
h_{ZF}	is the height of the lower band, in millimetre
l_m	is the height of the equivalent middle band from stability calculations, in millimetre
l_o	is the height of the equivalent upper band from stability calculations, in millimetre
l_u	is the height of the equivalent lower band from stability calculations, in millimetre
p_e	is the continuously active external pressure, in newton per square millimetre
p_i	is the continuously active internal pressure, in newton per square millimetre
p_{stat}	is the overpressure at the tank base due to the contents, in newton per square millimetre
$p_{stat(i)}$	is the overpressure at lower edge of the band (i) due to the contents, in newton per square millimetre
S	is the safety factor (see part 1)
T_A	is the temperature of the outside air, in degree celsius
T_D	is the temperature of the roof, in degree celsius
T_M	is the contents' temperature, in degree celsius
t	is the calculated thickness of the band omitting the welding factor f_l from the calculation of $\sigma_{al.}$, in millimetre
t_B	is the thickness of the base, in millimetre
t_D	is the thickness of the roof, in millimetre
t_m	is the thickness of the equivalent middle band from stability calculations, in millimetre
t_o	is the thickness of the equivalent upper band from stability calculations, in millimetre